UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK
--X
                                     :   17cv1789 (DLC)

SECURITIES AND EXCHANGE COMMISSION,   :

                                       :   OPINION AND ORDER

                Plaintiff,   :

                                       :

          -v-   :

                                       :

LEK SECURITIES CORPORATION, SAMUEL   :
LEK, VALI MANAGEMENT PARTNERS d/b/a   :
AVALON FA, LTD., NATHAN FAYYER, and   :
SERGEY PUSTELNIK a/k/a SERGE PUSTELNIK:

                                       :

               Defendants.   :

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DENISE COTE, District Judge:

This Opinion addresses the motions of defendants Lek

Securities Corporation ("Lek Securities") and Samuel Lek ("Lek";

together with Lek Securities, the "Lek Defendants") to exclude

expert testimony to be offered at trial on behalf of plaintiff

United States Securities and Exchange Commission ("SEC") by

Terrence Hendershott and Neil Pearson, and the SEC's motions to

exclude testimony from the Lek Defendants' experts David J. Ross

and Alan Grigoletto, offered in rebuttal to the Hendershott and

Pearson testimony. It also addresses the SEC's motion to

exclude the testimony of Haim Bodek, offered by defendants

Avalon FA Ltd. ("Avalon"), Nathan Fayyer ("Fayyer"), and Sergey

Pustelnik ("Pustelnik"; together with Avalon and Fayyer, the

"Avalon Defendants") in rebuttal to Hendershott and Pearson's

testimony. Hendershott and Pearson have analyzed patterns of

trading at Avalon, which conducted its trading through Lek

Securities. For the following reasons, the Lek Defendants'

motions to exclude Hendershott and Pearson as trial witnesses

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are denied; the SEC's motion to exclude Bodek is granted; and the SEC's motions to exclude Ross and Grigoletto are granted in part.

Background

The SEC sued the Lek and Avalon Defendants on March 10, 2017, principally alleging that traders at Avalon engaged in two schemes to manipulate the securities markets and that they did so through trading at Lek Securities, a broker-dealer based in New York. Avalon is a foreign day-trading firm whose traders are largely based in Eastern Europe and Asia. Avalon is not a registered broker-dealer and relies on registered firms like Lek Securities to conduct trading in U.S. securities markets. The SEC contends that Lek reaped significant commissions and fees from Avalon's trading.

The SEC brought claims for violations of several provisions of the Securities Exchange Act of 1934 (the "Exchange Act"). The claims against the Lek Defendants are primarily for aiding and abetting, in violation of Section 20(e) of the Exchange Act, the Avalon Defendants' violations of Sections 10(b), 17(a), and 9(a) of the Exchange Act. See SEC v. Lek Sec. Corp., 276 F. Supp. 3d 49, 57-58 (S.D.N.Y. 2017) ("Lek II").

The same day this case was filed, the SEC obtained an ex parte temporary restraining order ("TRO") against Avalon. An Opinion of March 29, 2017 denied Avalon's motion to modify the

TRO. See SEC v. Lek Sec. Corp., No. 17cv1789(DLC), 2017 WL

1184318 (S.D.N.Y. Mar. 29, 2017). Avalon thereafter consented

to the entry of an injunction against it. An Opinion of August

25, 2017, denied the Lek Defendants' motion to dismiss the

claims against them.[1] Lek II, 276 F. Supp. 3d at 57.

Following the completion of discovery, the Lek Defendants

moved for summary judgment on August 24, 2018. On the same

date, they also moved to exclude the testimony and opinions of

Hendershott and Pearson, the SEC's expert witnesses. Those

motions became fully submitted on November 2, 2018.

On October 5, the SEC moved to exclude all five of the

defendants' expert witnesses including Ross, Grigoletto, and

Bodek, who the Defendants intend to call as rebuttal witnesses

to Hendershott and Pearson. Those motions became fully

submitted on November 16.

This Opinion addresses the motions to exclude Hendershott,

Pearson, Ross, Grigoletto, and Bodek. The main threads of the

opinions offered by these experts are outlined below, beginning

with Hendershott's opinion regarding the phenomenon of layering

and Ross, Grigoletto, and Bodek's rebuttals to Hendershott's

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[1] Opinions of January 16 and November 14, 2018 denied,
respectively, a motion to disqualify the SEC's attorneys and
motions to compel production of documents relating to one of the
SEC's witnesses. See SEC v. Lek Sec. Corp., No. 17cv1789(DLC),
2018 WL 417596 (S.D.N.Y. Jan. 16, 2018); SEC v. Lek Sec. Corp.,
17cv1789(DLC), 2018 WL 5981952 (S.D.N.Y. Nov. 14, 2018).

opinion, followed by an outline of Pearson's opinion regarding

the phenomenon of cross-market trading and Ross, Grigoletto, and

Bodek's rebuttals to Pearson's opinion.

I. Summary of Hendershott Reports[2]

Hendershott analyzed trade orders, cancellations, and

executions made by Avalon traders from December 2010 through

September 2016 (the "Avalon Trade Data"). The orders analyzed

by Hendershott are limit orders, or "instructions to trade at a

price that is no worse than the limit price specified by the

trader."[3]

Hendershott analyzed the Avalon Trade Data to determine

whether any of Avalon's order and trade activity was consistent

with layering. Hendershott defines layering as a trading

strategy whereby traders place "visible limit orders . . . that

they do not intend to execute." They place these orders "to

create an artificial appearance of supply or demand to improve

the execution of their other orders." Visible limit orders are

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[2] Hendershott submitted three affirmative reports, dated April 3 and June 23, 2017, and March 15, 2018. The first report is his principal report. The second and third reports are supplemental reports. Hendershott also submitted reply reports to Ross, Grigoletto, and Bodek's rebuttal reports regarding layering. Each of those reports is dated June 22, 2018.

[3] Thus, a limit order to buy at $5 per share will be executed at $5 or less, and a limit order to sell at $5 per share will execute at $5 or more.

informative; they are predictive of future price movements. As

a result, they can impact trade prices. Among the market

participants that rely on data about pending limit orders that

are visible to the markets are market makers,[4] high-frequency

traders, and investors that use algorithms to implement their

trading strategies, such as institutional investors.

   As explained by Hendershott, when engaged in layering a

trader will place a greater number of visible limit orders on

the side of the market where the trader does not intend for the

trades to execute and a smaller number of orders on the side of

the market where the trader intends for the trades to execute.

For instance, a trader will typically place a large number of

buy (or sell) orders without intending for those orders to

execute in order to increase the perceived demand (or supply) of

the stock and therefore influence the price per share or volume

of shares the trader is able to sell. A trader will then place

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[4] Market makers are broker-dealers in securities that publish or
furnish competitive bid and offer prices for a particular
security and execute securities transactions at the quoted
prices. See 17 C.F.R. § 240.15c3-1(c)(8); see also 5 Hazen,
Treatise on the Law of Securities Regulation § 14:108 (2018). A
market maker must buy and sell securities at its posted prices,
which results in the market maker "frequently . . . holding long
and short positions in the securities in which he or she makes
the market." Id. The "spread" between the market maker's
quoted bid and offer prices "typically determines the market
maker's profit on any transaction." United States v. Bleznak,
153 F.3d 16, 18 (2d Cir. 1998). Market makers exist for both
stock and options.

a smaller number of sell (or buy) orders that the trader intends
to execute. The trader will then cancel the buy (or sell)
orders. The side of the market where the trader places the
greater number of orders the trader does not intend to execute
is referred to as the "Loud" side. The other side of the
market, with the smaller number of orders the trader does intend
to execute, is referred to as the "Quiet" side.

Using the methods described below, Hendershott concluded
that Avalon's order and execution activity was frequently
consistent with layering. Using a series of conservative
measures, he identified 675,504 sets of trades consistent with
layering over a period from December 2010 to September 2016.
This trading resulted in Avalon earning more than $21 million in
revenue, $12 million of which was earned in 2015 and 2016. The
Avalon trading that was consistent with layering accounted for
more than 45% of Avalon's trading revenue, even though it made
up less than 5% of Avalon's trading volume.

A. Identification of Layering Loops

Hendershott applied five criteria to identify groups of
orders, cancellations, and executions consistent with layering.
First, Hendershott considered only instances where a trader
places both buy and sell orders in a single stock, because
layering is a strategy that involves a trader placing orders on
both sides of the market. Second, Hendershott only considered

instances where the orders were entirely resolved through cancellation or execution within 60 seconds, even though it is possible for traders to engage in a layering scheme through transactions that last longer than 60 seconds. The parties refer to these groupings as "Loops."

Third, Hendershott required both the number of visible orders and the number of shares in those orders on the Loud side of a Loop to be greater than both the orders and shares on the Quiet side by at least two to one (the "Order Imbalance").[5] Approximately 2 million Loops from the Avalon Trade Data met Hendershott's first three criteria.

Fourth, Hendershott eliminated Loops where the ratio of executed shares on the Quiet side to the Loud side was less than three to one (the "Execution Imbalance"), even though the Loud-side shares were more numerous. Hendershott contends that considering only Loops with an Execution Imbalance of at least three to one eliminates trading strategies such as market making from the Loops.

Fifth, Hendershott eliminated Loops if a Loud-side order was placed more than one second after the last Quiet-side execution or cancellation. He reasoned that this was consistent with a layering strategy, which typically involves placing Loud-

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[5] Hendershott also omitted Loops with only three orders or less.

side orders to achieve favorable execution prices for Quiet-side orders. Hendershott explains that, together, these five criteria create a conservative data set reflecting patterns of layering activity. Applying these criteria yielded a total of 675,504 Loops that Hendershott found to be consistent with layering (the "Layering Loops").[6] Of those, 663,994 occurred after March 12, 2012.[7]

B. Further Analyses

Having identified Layering Loops, Hendershott then conducted four analyses ("Further Analyses") of all or some of the Layering Loops to evaluate whether the Loops did indeed have characteristics consistent with layering and to eliminate the possibility that the activity had occurred as part of a non-layering strategy such as market making. The four Further Analyses were a Cancellation Analysis, Position Analysis, NBBO Movement Analysis, and Realized Spread Analysis.

In the Cancellation Analysis, Hendershott measured how

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[6] Hendershott's initial report concluded that there were 675,506 Layering Loops in the Avalon Trade Data. His June 2017 supplemental report removed two Loops because of a coding error.

[7] This date is relevant in light of the Supreme Court's decision in Kokesh v. SEC, which applied a five-year statute of limitations to court-ordered disgorgement in SEC actions such as this. See 137 S. Ct. 1635, 1644 (2017). Hendershott's June 2017 supplemental report provides the number of Layering Loops that occurred after March 12, 2012, approximately five years before this action was filed on March 10, 2017.

frequently Loud-side orders are cancelled shortly after the Quiet-side orders are executed. He found that 85% of Loud-side orders were cancelled within 3 seconds of the final Quiet-side execution or cancellation, and that 90% of Loud-side orders were cancelled within 4 seconds of the final Quiet-side execution or cancellation. He concluded that this result "is consistent with a layering strategy which tries to minimize the execution rate of Loud-side orders."

For the Position Analysis, Hendershott compared the Order Imbalances in the Layering Loops and the trader's opening position to test whether the Layering Loops might be consistent with trading by market makers. As Hendershott explains, a typical way for market makers to manage risk is to place orders in the opposite direction of any position that they have at the start of a Loop. In contrast, when engaged in layering, a trader is attempting to mislead the market and will place more orders on the side in which the trader already has a position. Having led the market to believe that demand for the stock is higher on that side, a trader engaged in layering will then execute on the Quiet side. The Position Analysis showed that when Avalon's position was long at the beginning of a Layering Loop, the buy side was the Loud side 88% of the time. Similarly, when the position was short at the beginning of the Layering Loop, the sell side was the Loud side 89% of the time.

Hendershott concluded that these results "are not consistent with market making, but are consistent with a layering strategy."

For the third and fourth analyses, Hendershott examined only those Layering Loops that occurred in discrete periods of time in three subaccounts identified to him by the SEC.[8] This created a subset of 87,000 Layering Loops.

In his third analysis, which is labelled the NBBO Midpoint Analysis,[9] Hendershott evaluated how often the stock price rose when the Loud side of the Layering Loop was the buy side, and how often the stock price fell when the Loud side was the sell side. According to Hendershott, over intervals such as a minute or less, the average change in the NBBO midpoint is zero and prices should rise or fall on average 50% of the time. Hendershott's NBBO Midpoint Analysis of the 87,000 Layering Loops revealed, however, that in those Loops where the Loud-side orders were purchases, the NBBO midpoint at the time of the Quiet-side sale executions was higher than at the start of the Loop 62% of the time. When the Loud-side orders were sales, the

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[8] The periods were August to December 2012 for subaccount 188, April to September 2013 for subaccount 208, and March to August 2015 for subaccount 128.

[9] The NBBO is the National Best Bid and Offer. The NBBO midpoint is the average of the best bid and offer prices.

NBBO midpoint was lower at the time of Quiet-side purchase executions than at the start of the Loop 64% of the time. Hendershott concluded that those results were "consistent with Avalon's Loud-side orders contributing to a favorable shift in the NBBO midpoint more often than would be expected by chance."

Finally, Hendershott applied a Realized Spread Analysis to the 87,000 Layering Loops, comparing the profitability of Loud-side and Quiet-side executions. He did so by comparing the price of each execution to the NBBO midpoint 5 minutes after the execution. Under this measure, there is a positive realized spread if a buy order is executed at a lower price than the NBBO midpoint 5 minutes later, and a positive realized spread if a sell order is executed at a higher price than the NBBO midpoint 5 minutes in the future. This analysis of the 87,000 Layering Loops found that the Quiet-side executions had a positive realized spread but the Loud-side executions had a negative realized spread. Hendershott concluded that this result was "not consistent with the Loud-side orders having an economic rationale on their own." Accordingly, the results from the Realized Spread Analysis were "consistent with Avalon impacting the market in order to execute its Quiet-side orders at a more favorable price than would have been available absent its Loud-side orders."

Hendershott also discussed the impact that layering can

have on markets generally. He opined that layering can harm

markets by creating uncertainty and decreasing market liquidity.

He added that layering can also increase the difficulty in

executing orders and can degrade market integrity, reducing

market participation.

II. Summary of Rebuttal Reports on Layering

The Lek Defendants have moved to exclude the testimony of

both Hendershott and Pearson. If they are unsuccessful, the

Defendants seek to offer at trial the testimony of Ross,

Grigoletto, and Bodek as rebuttal expert testimony. The

principal arguments contained in the three defense experts'

layering reports are described here.

A. Ross's Opinions on Layering

Ross opines that Hendershott's analysis is "fundamentally

flawed" because it does not establish that Avalon acted with

manipulative intent when it placed the Loud-side orders in the

Layering Loops. Since manipulative intent is an essential

component of layering, Ross asserts that Hendershott is unable

to "ascertain whether the trading in any specific Layering Loop

constitutes layering."

Ross also contends that Hendershott's criteria for

identifying layering is "suspect" because the ratios Hendershott

selected for the Order Imbalance and the Execution Imbalance

screening criteria are not found in any statute, regulation or

peer-reviewed article. Ross points out that there would be many

fewer Layering Loops if the ratios were changed to 10 to 1. He

also complains that Henderson identifies a Loop as a Layering

Loop if his two ratios exist at any time during the Loop instead

of measuring the ratios only at the time of the Quiet-side

executions. He argues that Hendershott's methodology for

identifying layering must be flawed since the Financial Industry

Regulatory Authority ("FINRA"),[10] when it provided Lek Securities

with a Supervision Report Card for seven months in 2016, only

identified one-fifth of Hendershott's Layering Loops as layering

activity.

Ross asserts that Hendershott's analysis is flawed due to

what he labels as "selection bias," specifically Hendershott's

failure to consider Avalon's other trading activity, which

constitutes the majority of its trading activity. Because the

majority of the Avalon Trade Data does not meet Hendershott's

definition of Layering Loops, Ross reasons that "Avalon was

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[10] FINRA is a self-regulatory organization ("SRO") registered
with the SEC. See Fiero v. Fin. Indus. Regulatory Auth., Inc.,
660 F.3d 569, 571 (2d Cir. 2011). All securities firms that
conduct business with the public must be members of FINRA, and
FINRA has authority to investigate and discipline member firms,
including Lek Securities, for failing to comply with federal
securities laws and regulations. See Id. at 571 & n.1. Among
its regulatory functions, FINRA issues report cards to broker-
dealers identifying instances of potential layering through the
broker-dealer.

necessarily engaged in trading strategies other than
'layering.'" Ross then divides the Avalon Trade Data into six
mutually exclusive categories, one of which is Hendershott's
Layering Loops.[11] Ross explains how the other five categories
are in one respect or another inconsistent with Hendershott's
description of a layering strategy. And, because the trading in
each of these five categories shares at least some of the
characteristics of the trading in the Layering Loops, Ross
concludes that this is additional evidence that the Layering
Loops are consistent with a non-layering strategy.

Next, Ross examines the Layering Loops. He identifies nine
different features of layering activity and measures how
frequently they appear in the Layering Loops. For instance, he
calculates how often Loud-side orders are cancelled one or more
seconds before the first Quiet-side order was entered. He then
argues that such cancellations are "inconsistent with the
alleged layering strategy because these cancellations

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[11] These categories are the Layering Loops; one-sided Loops,
which have trading only on one side of the market; long Loops,
which last for longer than 60 seconds; balanced order entry
Loops, which are Loops that do not satisfy Hendershott's Order
Imbalance criterion but which satisfy his other criteria;
balanced order execution Loops, which do not satisfy
Hendershott's Execution Imbalance criterion but which satisfy
his other criteria; and late Loud-side order Loops, which are
Loops that satisfy Hendershott's criteria except that they
include Loud-side orders placed more than one second after the
last Quiet-side execution or cancellation.

necessarily reduced any apparent order imbalance." In addition,

Ross offers two further datapoints in a footnote to his report.

Ross calculates that Avalon's Loud-side orders had an average

duration of 10.18 seconds. He also calculates that 56.5% of

Avalon's Loud-side orders were placed "at or inside" the NBBO.

According to Ross, these characteristics "increased the

likelihood" that the Loud-side orders would execute.

Finally, Ross discusses Hendershott's Further Analyses.

For instance, Ross notes that while Hendershott found that all

of Avalon's Loud-side orders were cancelled within five seconds

of the last Quiet-side execution or cancellation in 93.4% of the

Layering Loops, Hendershott found that only happened within one

second for 51.8% of the Layering Loops.

B. Grigoletto's Opinions on Layering

Before offering opinions on the layering scheme alleged by

the SEC, Grigoletto provides background on the equities and

options markets, including a discussion of how trading has

evolved since the development of algorithmic trading practices.

Among other things, he explains that market makers are the

primary source of immediate liquidity for options markets. They

are required by exchanges to make a two-sided market by holding

themselves out to buy and sell at competitive prices or quotes.

In return for providing this service, they receive lower fees

and better capital treatment from the exchange and clearing

firm. When a trader places an order at a quoted price, it is
assigned to a market maker, depending on the rules of the
particular exchange.

After providing background information, Grigoletto
expresses opinions about Avalon's alleged layering scheme. He
begins by noting that, in his view, there is no universally
agreed upon definition of layering. Assuming the definition
provided by the SEC, however, Grigoletto concludes that Avalon's
equity trading was not consistent with layering because Avalon's
Loud-side orders were "consistent with the goal for the trades
to be executed." Relying on the analysis in Ross's report,
Grigoletto explains that Avalon's allegedly non-bona fide orders
were "primarily at or inside the NBBO," and that the orders
rested in the market on average for over 10 seconds -- what he
calls an "eternity" in modern equities markets. Because other
market participants could have interacted with these orders,
Grigoletto concludes that Avalon's Loud-side orders cannot be
deceptive and do not give a false impression of supply and
demand.

Grigoletto also argues that traders should not be liable
for masking their trading intentions. He claims that placing a
limit order in an order book is not a representation that the
trader intends to execute it; it is merely a representation that
the trader will execute it at the entered price and volume for

as long as it is posted. To the extent Avalon's trading

strategy harmed other market participants, such as market

makers, Grigoletto observes that securities markets are designed

to be competitive and opines that market makers should adjust

their algorithms to account for Avalon's trading.

Grigoletto also addresses Hendershott's layering report

directly. Because he bases his conclusions on Ross's report,

his criticisms of Hendershott's analysis largely mirror those

discussed above in connection with Ross's report. For example,

he claims that Avalon's trades do not always show an order

imbalance at the time of the Quiet-side execution, and that

Hendershott failed to consider the order of trading events --

e.g., whether the Quiet-side order was placed before or after

the Loud-side orders. He also argues that Hendershott's report

is skewed because Hendershott failed to consider the vast amount

of Avalon's trading that was not included in the Layering Loops.

Grigoletto reviewed the trading in an Avalon subaccount in the

security Cabela's Incorporated ("CAB"). From that study, which

included four of Hendershott's Layering Loops, Grigoletto

concluded that Avalon's trading is "not consistent with

layering."

C. Bodek's Opinions on Layering

Bodek's report is difficult to understand. It appears to

make the following points. Relying on his analysis of eight

examples of Layering Loops discussed in Hendershott's reports,
Bodek opines that Avalon's trading activity "does not amount to
layering as a species of market manipulation," "does not
constitute market manipulation more generally because it does
not produce an artificial price impact," and "does not violate
any laws or regulations specifically referenced by the SEC."
Bodek contends that Avalon's trading strategy incorporates a mix
of "exploratory trading," "market impact," "scalping," and
"quasi-market making" strategies. Through these strategies,
Avalon "consistently demonstrated the lack of buy and sell
interest at particular levels in the market and then took
speculative positions at sensible price points." Bodek devotes
much of his report to explaining these strategies.

    According to Bodek, exploratory trading involves placing
orders on one side of the market to assess liquidity on the
opposite side of the market. To do this, Bodek explains, a
trader may place a series of small, "aggressively-priced" orders
on one side of the market. If the orders execute, the trader
will suffer an economic loss but will have more certainty that
there is liquidity on the opposite side of the market. If the
orders fail to execute, the trader will have identified a lack
of "contra-side liquidity." In either case, Bodek explains that
exploratory trading allows traders to evaluate liquidity and
assess the realistic trading range for a particular security.

Bodek's report further explains that an exploratory trading

strategy may include a market-impact component, which Bodek

sometimes refers to as a "pressure strategy." He admits,

however, that market impact is typically considered a cost to

traders, since the very act of consummating a transaction

usually pushes market prices in an adverse direction.

Although Bodek admits that Avalon's trading strategy pushed

prices in the direction of Avalon's Quiet-side orders, he claims

that this strategy is not manipulative. According to Bodek,

this is because Avalon's Loud-side orders "typically improved

over" (i.e., were "inside") the NBBO.[12] He explains that this

means the Loud-side orders were likely to execute, and

"result[ed] in a likely correction of the prevailing market

price rather than an artificial price impact."

Bodek next argues that Avalon's orders on the Quiet side

represented a quasi-market making strategy. He explains that

after Avalon's exploratory trading and market-impact strategies

"improv[ed] the market price" and exposed a lack of "contra-side

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[12] Bodek's opinion on this point appears to be based on his
review of the eight examples of Layering Loops included in
Hendershott's report and a press release issued by FINRA.
Citing to the press release, Bodek argues that layering involves
the placement of multiple, non-bona fide orders on one side of
the market at price levels "at or away from the NBBO." Bodek
argues that, "[s]ince Avalon's orders emphasized improving the
NBBO," Avalon's trading "does not [fit] the definition of
layering."

liquidity," Avalon "place[d] larger orders with hidden or
reserve size that provide[d] liquidity at the upper and lower
bound of Avalon's trading range." According to Bodek, these
Quiet-side orders helped "make a market" in part because they
"provide[d] potentially significant liquidity to other market
participants." Once Avalon executed its Quiet-side orders,
Bodek explains that it was rational for Avalon to cancel its
outstanding orders on the Loud side. According to Bodek, this
is because Avalon is a "two-sided quasi-market maker." Thus,
while it was "natural" for Avalon to cancel Loud-side orders
after entering into a short position on the Quiet side, Bodek
claims that Avalon "would have undoubtedly had a different
response if it had established a long position" through its
Loud-side orders. Bodek concludes that "[t]he conditional
nature of Avalon's orders as a two-sided quasi-market maker"
renders Avalon's trading activity legitimate and non-
manipulative.

III. Summary of Pearson Reports

As described in his principal expert report,[13] Pearson
reviewed two sets of trading activity by Avalon traders. The
first was Avalon orders, cancellations, and executions in stock

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[13] Pearson has submitted two reports, dated March 16, 2018 and
June 22, 2018. His second report is a rebuttal to Ross's Cross-
Market Strategy report.

and options through Lek Securities from November 2010 through September 2016. The second set was Avalon orders, cancellations, and executions in stocks and options through Lime Brokerage between April 1, 2013 through April 12, 2013. The two sets of trading activity involved both put options -- contracts that give the holder of the option the right to sell the underlying stock at a set price on or before a set date -- and call options -- contracts that give the holder of the option the right to buy the underlying stock at a fixed price on or before a set date. See generally Olagues v. Perceptive Advisors LLC, 902 F.3d 121, 123, 126 (2d Cir. 2018).

Pearson examined this Avalon trading activity to determine if there were patterns of orders, cancellations, and executions consistent with what the SEC has termed the "Cross-Market Strategy." In this scheme, a trader manipulates the prices of options through trading in the corresponding stocks. First, the trader buys or sells a stock to impact the stock price and cause the stock to trade at an artificial price. Because options prices are related to stock prices, a movement in a stock's price also affects the price of the options in that stock. Second, the trader establishes an options position that will benefit from the underlying stock returning to its price before the trader placed the stock trades. Third, the trader begins to liquidate the stock position, which moves the stock price back

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to its initial level, which generally allows the trader to close out the options position at a profit. Typically, the trader loses money on the stock transactions but more than offsets any losses through the profits made on the options transactions.

A. Identification of Cross-Market Loops

Pearson first used three criteria to identify patterns of trading -- referred to as "Loops" -- that were potentially consistent with a Cross-Market Strategy. First, an Avalon trade group[14] had to place orders and trades in both a stock and the corresponding option. Second, there could not be any overnight positions. Third, the Loop had to have both stock and option orders or positions open at the same time. Pearson identified 796 Loops that fit these initial criteria, which represented 95% of Avalon's option trading volume.

Pearson divided the Loops into three patterns: One-Directional Loops, Multi-Directional Loops, and Overshoot Loops. In One-Directional Loops, the trader's stock position was only or predominately long (or short). To be predominately long or short, the position had to be more than four times greater than the largest inverse (short or long) position. In Multi-

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[14] Various trade groups accessed U.S. markets through Avalon. Pearson identified which trade group placed the stock or options orders by referring to the first three characters of the trader's identification number. An order entered by trader "038_002S," for example, belongs to the "038" trade group.

Directional Loops, the trading activity included both long and short stock positions and the largest long or short position was four times or less than four times greater than the largest inverse (short or long) position. Overshoot Loops are Multi-Directional Loops where the trader traded options only in one direction -- either buying puts and/or selling calls or selling puts and/or buying calls, but not both.

Next, Pearson analyzed the "nature and timing of the purchase or sale of options relative to the trading in the stock" in each of the Loops to determine if the trading patterns were consistent with a Cross-Market Strategy. To do so, Pearson defined the maximum stock position, either long or short, in a Loop as the Equity Peak. He then applied screening criteria to each Loop type.

In One-Directional Loops where the Equity Peak was long ("Long One-Directional Loops"), Pearson concluded that Avalon's trading was consistent with the Cross-Market Strategy if two additional criteria were satisfied. First, the loop had to involve "either a purchase of puts and/or a sale of calls when the stock position is within 20% of the maximum long stock position." Second, the options positions had to be one-sided, meaning the largest position in purchased puts or sold calls was more than four times as large as the inverse position (sold puts or purchased calls). According to Pearson, Loops that satisfy

both criteria are consistent with the Cross-Market Strategy because "the options trades to open the options position occur at a point when the puts are artificially cheaper and the calls are artificially more expensive as a result of the long stock purchases."

Pearson applied the opposite two criteria to One-Directional Loops where the Equity Peak was short ("Short One-Directional Loops"). For a Short One-Directional Loop to be consistent with the Cross-Market Strategy, Pearson required "a purchase of calls and/or a sale of puts when the stock position is within 20% of the maximum short stock position." Additionally, "the largest position in purchased calls and/or sold puts [had to be] more than four times as large as the largest position sold calls and/or purchased puts." Pearson explains that Short One-Directional Loops that satisfy these two criteria are consistent with the Cross-Market Strategy because "the options trades to open the options position occur at a point when the calls are artificially cheaper and the puts are artificially more expensive as a result of the short stock purchases." Applying these criteria, Pearson identified 497 Long and Short One-Directional Loops consistent with the Cross-Market Strategy.

Pearson applied similar criteria to identify which Multi-Directional and Overshoot Loops were consistent with the Cross-

Market Strategy. Applying those criteria yielded 36 Overshoot Loops and 103 Multi-Directional Loops that he concluded were consistent with the Cross-Market Strategy. Together with the One-Directional Loops, Pearson identified 636 Loops, which are termed the Cross-Market Loops, consistent with the Cross-Market Strategy.[15]

B. Further Analyses

Pearson then applied seven Further Analyses to all or some of the Cross-Market Loops to determine "whether the stock price movements and returns" during the trading in the Cross-Market Loops "are consistent with the Cross-Market Strategy." These analyses were the Stock Return Analysis, Trading Volume Analysis, Return Reversal Analysis, News Analysis, Cancellation Analysis, But-For Analysis, and Sensitivity Analysis.

For the Stock Return Analysis, Pearson examined stock price movement during the One-Directional and Overshoot Loops. Pearson measured stock price in three periods: between the beginning of the Loop and the Equity Peak, between the Equity Peak and the Equity Liquidation,[16] and between the Equity Liquidation and the end of the Loop. Pearson analyzed both the

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[15] All but seven of the 636 Cross-Market Loops were executed by trade group "038."

[16] Pearson defines the Equity Liquidation as the time when the trader begins to liquidate the stock position.

average return and the market-adjusted return to control for market-wide movements in stock prices. For both types of return, the mean return for long Loops was positive from the Loop start to the Equity Peak, negative from the Equity Peak to Equity Liquidation, and negative from the Equity Liquidation to Loop end. For the short Loops, the mean for both types of return was negative from Loop start to Equity Peak, positive from Equity Peak to Equity Liquidation, and positive from Equity Liquidation to Loop end. Pearson concluded that these results are consistent with the Cross-Market Strategy and that it is "extremely unlikely -- essentially impossible -- that the average returns from Loop Start to Equity Peak occur by chance."

The Trading Volume Analysis compared Avalon's share of a stock's total trading volume between the Loop start to Equity Peak of each One-Directional and Overshoot Loop to determine if Avalon's trading patterns were large enough to impact stock price. First, Pearson determined Avalon's share of the stock's total trading volume during each Loop. For long Loops, Avalon's trading between Loop start and Equity Peak represented, on average, approximately 48% of the total trading in the stock. For short Loops, Avalon's trading between Loop start and Equity Peak made up, on average, approximately 52% of the total trading in the stock. Pearson concluded that, for both long and short Loops, Avalon's share of trading volume was "more than

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sufficient to impact stock prices." Pearson then used a regression analysis to estimate the relationship between Avalon's trading volume and the market-adjusted returns from the Loop start to the Equity Peak. Pearson explains that this analysis showed that "the magnitudes of the returns from Loop Start to Equity Peak are explained by the trader's share of market trading volume during the same period." Finally, Pearson examined Avalon's share of each stock's daily trading volume and found that this averaged roughly 2.9% of the daily trading volume in long Loops and 2.8% in short Loops. Pearson explained that these percentages are substantial and also sufficient to impact market prices.

Next, in the Return Reversal Analysis, Pearson analyzed whether movements in stock prices during the Loops could be explained by new information entering the market instead of by the stock trading activity. First, he assessed whether the changes in stock price between Loop start and Equity Peak reversed themselves by the Loop end. If the price changes between Loop start and Equity Peak reversed between Equity Peak and Loop end, Pearson explains, that makes it unlikely that the price changes were due to new information, which tends to have a longer impact on prices. Pearson found that the price changes did reverse themselves and that this result was unlikely to occur by chance. Second, Pearson examined a subset of 20

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randomly selected One-Directional Loops to determine whether news had been published about the relevant stocks on the day of the Loop that could have affected stock prices. He concluded that no news that would have affected prices was released on the day of any of the 20 Loops he reviewed.

In the Cancellation Analysis, Pearson examined One-Directional and Overshoot Loops to determine when during each Loop Avalon cancelled outstanding orders to buy or sell stock. His review showed that around the Equity Peak, the average number of equity order cancellations increased and the average equity order balance decreased to close to zero. He concluded that this is "consistent with the Cross-Market Strategy because the trader's initial stock trades and orders are intended to move the stock price" until the Equity Peak, at which point the trader establishes options positions and cancels outstanding orders to "allow[] the stock price to return toward its pre-existing level."

The But-For Analysis considered whether the stock trading in 20 randomly selected Cross-Market Loops affected the prices of the related options. Pearson first compared the net revenue that Avalon actually made on its options trades to what the net revenue would have been had the initial options trades taken place at the prevailing prices for the options before each Loop began. He found that Avalon's actual revenue from the 20 Loops

was positive $224,231, but that, had the initial options trades occurred at the prices prevailing before the stock trading, the revenue would have been negative $411,429. In a second But-For Analysis, Pearson compared the actual trading revenue for the 20 Loops to what the revenue would have been if Avalon had established options positions at prices prevailing before each Loop and if Avalon had closed its options positions at the time it began liquidating its stock positions. In the hypothetical scenario, the 20 Loops would have resulted in a net loss of $1,600,164, whereas the actual revenue for those 20 Loops was, as noted above, positive $224,231. Pearson explained that these measures indicate that Avalon's options trading was only profitable because Avalon's stock trading artificially impacted the prices of options.

Finally, Pearson conducted a Sensitivity Analysis to determine whether his results were sensitive to the specific parameters he used to define Cross-Market Loops. Pearson varied the criterion that requires options trades to have occurred within 20% of an Equity Peak to criteria of cut-offs between 0% and 100% of the Equity Peak. He found that the number of Cross-Market Loops did not change significantly even when this parameter changed. He also varied the ratio used to differentiate types of Cross-Market Loops and found that changing the definition of Multi-Directional Loops from a one-

to-four ratio (between the longest or shortest stock position and the inverse position) to a one-to-ten ratio did not significantly change the number of Cross-Market Loops.

C. Additional Opinions

Pearson also opined that the Cross-Market Loops did not have a legitimate economic rationale. Pearson first observed these Loops were only profitable due to the change in options prices achieved by the trader's stock transactions. He then considered whether the Loops could be explained as a stock trading strategy, as an options trading strategy, or as a method of learning about market liquidity. He concluded that the first two explanations are untenable because the stock transactions, in isolation, are unprofitable, and because the options trades occurred after stock trading had already occurred, which is inconsistent with a delta-hedging strategy. He additionally rejected the explanation that the Loops are explained as a method of determining stock liquidity because, in his view, the significant size of the stock trades relative to total trading activity and the impact the trades had on stock prices are inconsistent with this explanation. Finally, Pearson opined that the Cross-Market Strategy harmed other market participants by causing other participants' stock and options trades to occur at artificial price levels created by the Avalon traders' manipulation.

IV. Summary of Rebuttal Reports on the Cross-Market Strategy

Ross, Grigoletto, and Bodek have proffered testimony in rebuttal to Pearson's analysis of the Cross-Market Strategy. Their principal arguments are described here.

A. Ross's Opinions on the Cross-Market Strategy

Ross's report addressing the Cross-Market Strategy principally makes the following points. Ross complains that Pearson's analysis is overbroad since it does not require Avalon's transactions in the Cross-Market Loops to fit the pattern of trading described in the SEC's complaint. In making this assertion, Ross does not acknowledge that the single pattern to which he refers was described in the complaint as an "example" of various cross-market trading patterns.[17]

Ross additionally argues that Pearson's analysis is unreliable because it suffers from what he labels as "selection bias." Ross asserts that, because Pearson considered only Loops where Avalon acquired both stock and options positions but not Loops where Avalon acquired only a stock position or only an options position, Pearson analyzed only a fraction, indeed a small fraction, of Avalon's trading. Ross contends that because Cross-Market Loops are not representative of all of Avalon's

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[17] The complaint asserted that Avalon traders "carried out the scheme in varied ways through combinations of buying and selling stock and corresponding put and call options."

trading, there is likely a "legitimate economic rationale" for the trading activity in the Cross-Market Loops.

Ross also argues that, without evidence about Avalon's intent, there is no basis to find that any impact on prices was "artificial" as opposed to an impact caused by "legitimate, non-manipulative trading." Ross suggests, for example, that Avalon traders may have expected a stock's price to change in a particular direction and traded accordingly.

Ross also asserts that Pearson's Cancellation Analysis is not probative of Avalon traders' intent because order cancellations naturally accompany the attainment of an Equity Peak. Ross next asserts that the But-For Analysis is fundamentally flawed because it measures the wrong things. Ross additionally claims that Pearson inaccurately characterized the profitability of the stock and options transactions that made up the Cross-Market Loops because Pearson only reported the total of the revenue and the average revenues for Cross-Market Loops, by category. Ross disaggregated the data and showed that some of the Loops did not fit the typical pattern.

Finally, Ross challenges Pearson's conclusion that the Cross-Market Loops lacked a non-manipulative economic purpose. Ross contends that Pearson failed to consider that the Avalon trading was the result of a dynamic trading strategy, where trades were placed for legitimate economic reasons, and then the

direction of the trading changed in response to new information or changes in market conditions.

B. Grigoletto's Opinions on the Cross-Market Strategy

Grigoletto states his opinions on Avalon's alleged Cross-Market Strategy in eight paragraphs of his report. He principally makes the following points.

First, Grigoletto explains that Avalon's options trading was legitimate because it was "consistent with a desire to seek profit from options Market Makers offering more liquidity than the Market Makers were able to profitably hedge." Citing primarily to a complaint that Citadel Securities filed with the SEC, Grigoletto opines that market makers exposed themselves to unnecessary risk by "delta hedging" their options positions in the corresponding equities markets. According to Grigoletto, "Avalon captured the liquidity difference between the options markets and the equities markets," which he asserts is "consistent with legitimate trading."

Second, Grigoletto asserts that Avalon's stock trades were not designed to decrease the price of the options that Avalon acquired. Instead, he contends that Avalon's stock trading is consistent with at least two alternative purposes: to evaluate whether market makers were quoting too much liquidity in the options markets relative to the equities markets, and to serve as a partial hedge in case Avalon executed options transactions

in the corresponding stock. To support this conclusion,
Grigoletto points to Ross's rebuttal report, which highlights
stock transactions that Avalon executed without corresponding
options trades and which purports to demonstrate that, in some
cases, Avalon's equity trades did not impact the stock price as
expected. He also points to his own experience, arguing that
traders do take positions to hedge anticipated trading and that
traders may test for market liquidity with large, executable
orders.

C. Bodek's Opinions on the Cross-Market Strategy

Again, Bodek's report is difficult to decipher. Bodek
appears to acknowledge that Avalon is engaged in cross-market
trading but asserts that it is not manipulative. Instead, he
contends that Avalon's equities and options trading consists of
a combination of two legitimate strategies: a "market impact"
strategy in the equities markets and a "liquidity arbitrage"
strategy in the options markets.

A market impact strategy, Bodek explains, involves placing
a series of orders on one side of the market (buy or sell) to
discover liquidity limits at the upper and lower ends of a
security's trading range. Bodek contends that Avalon used this
strategy to build a speculative position in the equities
markets. Bodek admits that market impact orders are "intended
to" and "of course have price impact" in the underlying stock,

and he admits that this price impact may harm other market participants. Nonetheless, Bodek opines that Avalon's market impact orders do not produce artificial price impact because the strategy uses "bona fide" orders that execute against real market participants. Any increase (or decrease) in price, he argues, results from the depletion (or addition) of liquidity on the opposite side of the equities market. Moreover, although Avalon's market impact strategy regularly resulted in substantial losses in its equities trading, Bodek concludes that the strategy did have a legitimate economic rationale because it was profitable when combined with Avalon's liquidity arbitrage strategy in the options markets.

A liquidity arbitrage strategy, according to Bodek, involves capturing a profit from price disparities in the equities and options markets.[18] As a result of Avalon's market impact strategy, Bodek explains that the "liquidity premium" -- i.e., the price of liquidity in the market -- becomes high in the equities markets but low in the options markets, where market makers react by quoting excessive liquidity. According to Bodek, this cross-market mispricing creates an opportunity for Avalon to "cover" or "reverse" its established position in

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[18] Bodek also claims that Avalon's strategy is like a "delta sweep" strategy to the extent it involves trading stock risk exposures in the options and equities markets.

the equities markets. To do so, Bodek explains that Avalon

engages in a "liquidity arbitrage" by purchasing options at a

liquidity premium lower than that available in the equities

markets. After establishing its options position and exiting

its equities position, Avalon ultimately closed out its options

positions for a profit. Bodek claims that this pattern of

trading -- namely, "exploiting oversize [sic] liquidity in

options markets" -- is not deceptive or manipulative because it

is executed through bona fide orders.

Discussion

Federal Rule of Evidence 702 governs the admissibility of

expert testimony. It provides:

> A witness who is qualified as an expert by knowledge,
> skill, experience, training, or education may testify
> in the form of an opinion or otherwise if:
>
> (a) the expert's scientific, technical, or other
> specialized knowledge will help the trier of fact to
> understand the evidence or to determine a fact in
> issue;
>
> (b) the testimony is based on sufficient facts or
> data;
>
> (c) the testimony is the product of reliable
> principles and methods; and
>
> (d) the expert has reliably applied the principles and
> methods to the facts of the case.

Fed. R. Evid. 702.

The proponent of expert testimony carries the burden of

establishing its admissibility by a preponderance of the

evidence. United States v. Williams, 506 F.3d 151, 160 (2d Cir. 2007). Expert testimony admitted under Rule 702 must be relevant and rest on a reliable foundation. Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 597 (1993); Williams, 506 F.3d at 160. An expert's opinion is relevant if it will "help the trier of fact to understand the evidence or to determine a fact in issue." Fed. R. Evid. 702; see Daubert, 509 U.S. at 591. Expert testimony that usurps the role of the fact finder, however, must be excluded. See United States v. Lumpkin, 192 F.3d 280, 289 (2d Cir. 1999).

An expert's opinion must have "a reliable basis in the knowledge and experience of his discipline." Daubert, 509 U.S. at 592. In general, a court should consider "the extent to which the expert's theory has been subjected to peer review and publication, whether the technique is subject to standards controlling the technique's operation, the known or potential rate of error, and the degree of acceptance within the relevant scientific community." United States v. Ulbricht, 858 F.3d 71, 116 n.50 (2d Cir. 2017) (citation omitted). This "Daubert reliability assessment" is a "flexible" inquiry, however, and "Daubert is not a definitive checklist or test for the reliability of expert testimony." Id. (citation omitted). "[W]hether Daubert's specific factors are, or are not, reasonable measures of reliability in a particular case is a

matter that the law grants the [court] broad latitude to determine." Id. (citation omitted).

There is no requirement that all expert testimony express opinions or conclusions that have been "established to a degree of scientific certainty." Restivo v. Hessemann, 846 F.3d 547, 577 (2d Cir. 2017). All experts, including "economists[,] may express professional opinions that fall short of definitive proof" as long as their "testimony [is] reliable under Rule 702." Id. at 576 (citation omitted). Instead, a court must "assess whether the expert employs the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." Id. at 577 (citation omitted).

"[A] trial judge should exclude expert testimony if it is speculative or conjectural or based on assumptions that are so unrealistic and contradictory as to suggest bad faith." Zerega Ave. Realty Corp. v. Hornbeck Offshore Transp., LLC, 571 F.3d 206, 213-14 (2d Cir. 2009) (citation omitted). "[N]othing in either Daubert or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the ipse dixit of the expert." Gen. Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997). When evaluating the reliability of expert testimony, "it is critical that an expert's analysis be reliable at every step." Amorgianos v. Nat'l R.R. Passenger Corp., 303 F.3d 256, 267 (2d Cir. 2002).

"[A]ny step that renders the analysis unreliable . . . renders the expert's testimony inadmissible. Id. (emphasis omitted).

A contention that an expert's assumptions are unfounded, however, may "go to the weight, not the admissibility, of the testimony." Restivo, 846 F.3d at 577 (citation omitted). "A minor flaw in an expert's reasoning or a slight modification of an otherwise reliable method" does not itself require exclusion; exclusion is only warranted "if the flaw is large enough that the expert lacks good grounds for his or her conclusions." Amorgianos, 303 F.3d at 267 (citation omitted). This is because "our adversary system provides the necessary tools for challenging reliable, albeit debatable, expert testimony." Id. "[V]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence." Id. (quoting Daubert, 509 U.S. at 596).

I. The Lek Defendants' Motion to Exclude Hendershott

The Lek Defendants principally argue that Hendershott's expert testimony should be excluded because his methods are novel and unreliable, and because his analysis suffers from what they label as "selection bias." For the following reasons, their motion to exclude his testimony is denied.

The Lek Defendants first assert that Hendershott's testimony is inadmissible because his multi-step filtering

process to locate Layering Loops has never been published, and he has not cited any basis in "law, regulation, practice, or academic literature" for it. They argue as well that the process he used appears to be different from the criteria used by FINRA and BATS Global Markets, Inc. ("BATS")[19] to identify layering.

The Lek Defendants do not challenge Hendershott's expertise. Nor could they reasonably do so. His area of expertise bears directly on the issues on which he is opining in this case. His research focus is the field of market microstructure, including strategies employed in high-frequency trading and how those strategies affect securities prices. There is broad agreement among the parties (and regulators) about what trading conduct constitutes layering. The methodology Hendershott employed to locate Layering Loops, which he identified as trading activity consistent with layering, springs directly from that well-accepted description of the

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[19] BATS was the parent company of several securities exchanges. See SEC, Order Granting Approval of Proposed Rule Change in Connection with the Proposed Corporate Transaction Involving BATS Global Markets, Inc. and CBOE Holdings, Inc., SEC Release No. 79585, 2016 WL 10678170, at *1 (Dec. 16, 2016) ("SEC BATS-CBOE Order"). BATS was also registered with the SEC as an SRO. See City of Providence v. BATS Glob. Mkts., Inc., 878 F.3d 36, 40 (2d Cir. 2017). BATS surveilled trading on its exchanges for potential layering. In 2016, BATS merged with the parent company of several other exchanges and is now referred to as CBOE. See SEC BATS-CBOE Order, 2016 WL 10678170, at *2-3.

phenomenon of layering. His methodology is a conservative

construct with objectively-defined steps that can be applied by

any expert to any body of trades. Those steps, and the criteria

implied in them, are reasonably related to the academic and

regulatory definitions of layering cited by the parties.

Hendershott has explained the bases for the criteria he used,

and the Lek Defendants have not shown that any step he employed

is in tension with the literature in the field. Moreover,

Hendershott designed a series of Further Analyses to confirm the

reliability of his methodology.

Hendershott was not required to design a methodology that

would identify the same sets of layering as a regulator.[20] There

is no requirement that experts use only those methodologies used

by exchanges or regulators. Exchanges and regulators are

performing different functions than trial experts, and they may

be using different data sets and more easily applied tests to

perform their tasks. Daubert and its progeny supply the test

that applies to the admissibility of expert testimony at trial.

Daubert requires that the expert employ "the same level of

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[20] Hendershott frequently used more conservative criteria than
BATS. For instance, at one time, BATS required the relevant
trading activity to occur within a 3-minute window; Hendershot
required it to occur within a 1-minute window. Hendershott also
was able to analyze every Avalon order and execution for the
period at issue in this case; it is not clear that any regulator
has the resources to do so or chose to do so.

intellectual rigor that characterizes the practice of an expert in the relevant field." Restivo, 846 F.3d at 577. Hendershott's methodology falls comfortably within that parameter.

The argument that Hendershott's testimony is inadmissible because of selection bias fares no better. The Lek Defendants use the term selection bias to refer to their argument, generally, that Hendershott failed to consider most of Avalon's trading -- that is, all of the trading outside the Layering Loops. That argument proceeds from a false premise.

The concept of selection bias in scientific studies most commonly refers to a sampling error where the sample selected is "unrepresentative of the general population to which inferences are to be made." 1 Faigman et al., Modern Scientific Evidence § 4:16 (2018). Hendershott's report does not reflect selection bias. Using the objective criteria outlined above, his methodology located 675,504 Layering Loops. Together, these Loops account for only about 4.5% of Avalon's total equity trading volume, but almost half of its total equity trading revenue. The methodology is not scientifically unsound because so much of the Avalon trading fell outside the series of screening tests. Nor is it unsound because Hendershott did not undertake separately to analyze and characterize the portion of Avalon's trading that did not survive the conservatively

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constructed screening tests. As Hendershott has observed, the
remainder of Avalon's trading may indeed include additional
layering activity. The SEC has decided to proceed to trial,
however, on only those trades that formed the Layering Loops.
The SEC has no obligation to separately analyze the remainder of
Avalon's trading that fell outside Hendershott's analysis to
understand its characteristics and/or to exclude the possibility
that it also contains trading consistent with layering.

II. The Lek Defendants' Motion to Exclude Pearson

The Lek Defendants contend that Pearson's testimony is
inadmissible because it is unreliable. They assert that
Pearson's methodology is crude and novel, suffers from selection
bias, and lacks probative value. For the following reasons, the
motion is denied.

Pearson constructed a set of screening tests to identify
instances of linked equity and options trading. He broke that
trading down into groups that shared characteristics, and then,
using conservative criteria, located Loops of equity and options
trading that formed patterns consistent with a Cross-Market
Strategy that created profits by manipulating prices. He tested
the reliability of his methodology through a series of Further
Analyses, repeatedly citing to authority in the field for the
tests and analyses that he employed. He explained the basis for
his findings that the Cross-Market Strategy was deceptive and

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harmful to other market participants. His analysis was
objective, detailed, well-supported by reference to academic
research, and thorough. There is no basis to exclude it from
the trial.

The Lek Defendants first contend that Pearson's methodology
is too crude and not carefully tailored to identify only Loops
that are consistent with the Cross-Market Strategy. For
example, they point out that Pearson's model identifies Cross-
Market Loops where the first trade is an options trade, as
opposed to a stock trade. This, and other examples of
individual trades which the Lek Defendants contend were
improperly captured in the Cross-Market Loops, fails to
undermine the admissibility of Pearson's testimony about his
model and the Cross-Market Loops identified by his model. The
Lek Defendants have not shown that, when the entire pattern of
trading in a Loop is examined, the model has failed reliably to
identify Cross-Market Loops consistent with manipulative
trading. The Lek Defendants have offered no basis to find that
manipulative cross-market trading may only exist if a trader
strictly adheres to a circumscribed set of steps in placing
trades. Nor have they pointed to any material variations from
the parameters established by the model that might undermine the
model's reliability. Variations in trading that would naturally
occur when trading is conducted by different individuals over

time do not undermine the utility of Pearson's model, which is constructed with a series of conservative screening tests.

The Lek Defendants also assert that Pearson's testimony is inadmissible because his model is novel and developed for this litigation. Pearson is an expert in the field of derivative financial instruments and used a commonly employed method for identifying and analyzing trading strategies in that field. He identified the characteristics of a manipulative Cross-Market Strategy, created screening tests to locate the Avalon trading consistent with that strategy, and then further analyzed the trading to confirm that the screening tests had indeed located trading that was consistent with a Cross-Market Strategy. As described above, having identified a universe of trading that bore the characteristics of a Cross-Market Strategy, Pearson tested his hypothesis that the trading was indeed manipulative with a series of inquiries. Many of the analytical tools he employed in that process are far from novel. They are tools described and employed in articles appearing in peer-reviewed journals. Much of his report is supported by citations to published works in the field of economics. A methodology may be reliable even if novel. The Lek Defendants have not shown that Pearson's model lacks the reliability required by Daubert and its progeny.

The Lek Defendants next argue that Pearson's testimony

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should be excluded because his entire analysis suffers from selection bias. The Lek Defendants explain that the trading in the Cross-Market Loops represents only a miniscule amount of the trading done by those traders, who largely traded stocks with no related options trading. They complain that Pearson did not analyze these traders' unrelated stock trades to discern their more general trading strategies. As was explained in connection with the motion to strike the Hendershott testimony, this is a misuse of the term selection bias. Pearson does not offer opinions about the entirety of Avalon's trading or about stock trading unconnected to options trading. He does not claim that the Cross-Market Loops are representative of the trading activity of any set of traders. Thus, Pearson was not required to apply his analysis to a random sample of the entirety of the Avalon trading data. Accordingly, the Lek Defendants' motion to exclude Pearson's testimony is denied.

III. The SEC's Motion to Exclude Ross

The SEC moves to exclude Ross's expert testimony, which the Lek Defendants seek to introduce to rebut testimony from Hendershott and Pearson. The SEC contends that Ross is unqualified to give his proposed testimony and that his opinions are unreliable and would confuse the jury. The SEC is largely correct and its motion is granted, with the exceptions identified below.

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A. Ross's Expertise

Ross is unqualified to give an opinion about the phenomena of layering and cross-market manipulation or about high-frequency trading practices more generally. Nothing in his educational background, his work experience, or even his prior work as an expert gives him the necessary expertise to opine on these matters or to critique other experts' opinions on these topics.

To testify as an expert witness, an individual must be "qualified as an expert by knowledge, skill, experience, training, or education." Fed. R. Evid. 702. "To determine whether a witness qualifies as an expert, courts compare the area in which the witness has superior knowledge, education, experience, or skill with the subject matter of the proffered testimony." United States v. Tin Yat Chin, 371 F.3d 31, 40 (2d Cir. 2004).

Ross received a Bachelor of Arts in economics from the University of Chicago in 1983, and an MBA from the University of Chicago Graduate School of Business in 1985. He does not have a doctorate. He has never worked as a trader or in the securities industry. He is an executive vice president of Compass Lexecon, a consulting firm, which he joined in 1985. He lists his fields of specialization at Lexecon as finance, labor economics and "economic analysis of law." His curriculum vitae lists eight

articles published between 1986 and 2006. Several are case

studies. The majority of the publications, including the most

recent article he co-authored in 2006, appear to concern the

calculation of damages in securities fraud litigation. He has

not published any work that involved a statistical analysis of

trading data. His only peer-reviewed article concerned NASDAQ

stock quotation practices.

Ross's principal claim to expertise is his work for Lexecon

as an expert supporting its clients' litigation positions. He

has testified as an expert on a wide variety of economic issues,

but never in a case involving layering or cross-market

manipulation. Nothing in this background qualifies Ross to

provide testimony that would assist the jury in understanding

and evaluating the testimony provided by the two SEC experts.

The Lek Defendants argue that Ross's experience in "finance

and economics" qualifies him to testify in this action about

layering and the Cross-Market Strategy. They cite three cases

in which his testimony has received favorable mention by

courts.[21] None involved market manipulation; in none of those

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[21] As the SEC points out, courts have also criticized Ross's work
as an expert. See United States v. Hall, 48 F. Supp. 2d 386,
386 (S.D.N.Y. 1999) (Chin, J.). Moreover, in his writings he
has taken positions at odds with established legal principles,
including espousing a belief that "trades should not be
prohibited as manipulative regardless of the intent of the
trader." As the Lek Defendants correctly observe, however, Ross
is not offering an expert opinion in this case about the

cases did Ross testify on topics related to his testimony here.

The Lek Defendants also contend that Ross is qualified because he has served as an expert in "hundreds of cases" involving "financial issues" and he has never been precluded from testifying because he was not qualified to give his expert opinion. Again, however, the Lek Defendants do not point to any case in which Ross has provided expert testimony about the market structures and trading practices at issue here. Their arguments in support of Ross's generic expertise underscore the SEC's point that Ross lacks the kind of advanced knowledge about market structures and trading that would enable him to offer an informed and reliable expert opinion relevant to this action. Even vast experience as an expert cannot substitute for knowledge about the particular field at issue.

Finally, the Lek Defendants contend Ross is qualified to testify about market microstructure and the trading strategies at issue here because he has acted as a consulting expert, assisting others in their conduct of economic analyses in these areas, most importantly in CFTC v. Oystacher, which was a layering case. No. 15cv9196, 2016 WL 3693429, at *35 (N.D. Ill. July 12, 2016). It is unquestionably true that one can acquire expertise through study and application without a formal degree

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legality of engaging in market manipulation.

in the area or even relevant work experience. But, as Ross's deposition demonstrated, he has not yet acquired the depth of knowledge and familiarity with this field that would qualify him as an expert.

Nonetheless, portions of Ross's reports do not call upon any expertise in market microstructure or the trading strategies at issue here. He is qualified to calculate, or to oversee the calculation of, certain phenomena. In a footnote to paragraph 27 of his layering report, Ross calculates the average duration of the Loud-side orders, as well as the percentage of Loud-side orders placed "at or inside" the NBBO. In a footnote to paragraph 18 of his Cross-Market Strategy report, Ross calculates how often the stock price was unchanged or moved in the opposite direction of stock trades in certain Cross-Market Loops. In paragraph 44 of his Cross-Market Strategy report, Ross disaggregates Pearson's analysis of Avalon's trading revenues and concludes that there are 230 Cross-Market Loops that do not fit the typical pattern. Ross is qualified to provide these calculations and will be permitted to present them at trial.

Because Ross is unqualified to serve as an expert on layering and Cross-Market Strategy, however, it is not surprising that the opinions he proffers regarding those topics are so unsound that they must be excluded on the merits. As

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described below, the opinions he offers rest on false assumptions, display faulty logic, depend on mischaracterizations, and would lead the jury astray if admitted.

B. Ross's Opinions on Layering

To put Ross's opinions in context, it is important to acknowledge that he does not take issue with Hendershott's description of what constitutes a layering strategy or with Hendershott's enumeration of the several serious harms that layering can inflict on markets. Instead, he purports to assess whether Hendershott's examination of Avalon's trading patterns, and Hendershott's identification of 675,504 Layering Loops, is valid. Ross's fundamental critique of Hendershott's analysis is that Hendershott failed adequately to assess the entirety of Avalon's trading, and that when one does so, Hendershott's analysis is shown to be unreliable. Ross's critique, however, suffers from several flaws in logic.

First, Ross's entire analysis rests on the false assumption that Hendershott found (and that the SEC has conceded) that any Avalon trading not included in a Layering Loop is neither layering nor manipulative. The sole basis for this assumption is that the SEC is not pursuing a claim that such trading is evidence of improper layering. The SEC's decision not to pursue additional claims or to assert a broader theory of layering does

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not provide a basis for Ross to assume that the remainder of the Avalon trading is non-manipulative. As Hendershott explains repeatedly, at several junctures in his analysis he chose a conservative test that narrowed the data set. He has not offered any opinion that the remainder of Avalon's trading includes neither layering nor manipulative trading.

Second, because of this faulty assumption, Ross's many comparisons between the trading patterns that can be observed in the Layering Loops and the remainder of the Avalon trading are unhelpful and misleading. It would confuse the jury into thinking that Hendershott's analysis is unreliable if other Avalon trading also had layering characteristics. Indeed, because the Hendershott analysis was conservative and yet found so many Layering Loops, it would be surprising if it located the only instances of layering at Avalon. Using the remainder of the Avalon trading activity as a measuring stick does not provide any sound basis for judging the strength of the Hendershott model for locating layering. Instead of undermining the Hendershott model, overlaps in trading characteristics between the Layering Loops and the remainder of the Avalon Trade Data should be unsurprising.

Third, Ross's unsound logic pervades his analysis. For example, Ross's expert report identifies nine criteria that he asserts are inconsistent with layering. Applying those

criteria, he concludes that over 94% of the Layering Loops are inconsistent with manipulative trading activity.[22] The report does not explain the source of the nine criteria, but in his deposition he explained that he teased those nine characteristics out of an example of layering activity that the SEC used in its complaint. There are many problems with such an approach. First, it displays an overly rigid understanding of layering. One set of trades should not serve as the sole benchmark for an entire trading strategy over a portfolio, much less for a market phenomenon. Second, Ross's construction of a list of attributes for all layering activity from a single set of trades displays Ross's lack of expertise and his inability independently to develop and articulate a model for identifying layering activity. He cites no research or other authority for this proposed list of layering characteristics. Third, it is Hendershott's analysis on which the SEC intends to rely at trial, not its complaint or a single illustration of layering given in the complaint.[23] Allowing this unreliable testimony to

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[22] In Hendershott's rebuttal report, he explains that he does not consider any of these characteristics to be inconsistent with a layering strategy. Hendershott also explains why much of the Ross discussion of the prevalence of these nine characteristics among the Layering Loops is misleading.

[23] The SEC provided an example of layering in its complaint but asserted as well in the complaint that "Avalon varied the specific method of its layering."

be admitted at trial would be highly misleading.

The Lek Defendants attempt to salvage this proposed testimony by contending that the complaint described the example of layering as "typical" and asserting that Ross was entitled to conclude that any variation from the example rendered a Layering Loop "inconsistent" with layering. This argument is meritless for the reasons described above. They also argue that Ross gave economic justifications for concluding that Layering Loops with variations from the example provided in the complaint are inconsistent with layering. But the deposition excerpts to which the Lek Defendants point reveal that Ross's primary source was indeed the complaint. And, as already discussed, Ross has no relevant expertise that would have permitted him to present any independent definition of layering or to develop any analytical framework for locating layering within a body of trading. The Lek Defendants also deny that Ross has constructed any independent analytical framework. The Lek Defendants have accordingly failed to salvage Ross's testimony about any Layering Loops being inconsistent with layering.

Ross also attacks Hendershott's (as well as Pearson's) analysis for its failure to prove that a trader acted with an intent to manipulate market activity. But Hendershott does not purport to testify as an expert about any individual's intent, nor could he. His testimony is that he has located trading

patterns that are consistent with layering activity. It is for

the jury to determine whether Avalon or any individual had the

intent to manipulate the market through layering activity. To

determine "the state of mind . . . of an individual who does not

testify . . . , the trier of fact must rely on the relevant

direct and circumstantial evidence that sheds light on the

individual's state of mind; she may not rely on an expert's

assessment." Fed. Housing Fin. Agency v. Nomura Holding Am.,

Inc., No. 11cv6201(DLC), 2015 WL 353929, at *5 (S.D.N.Y. Jan.

28, 2015). Because an expert may not opine as to the state of

mind of Avalon and its traders, Ross's testimony that

Hendershott has failed to do so is both irrelevant and

inadmissible.

Ross also makes assertions without any support whatsoever.

For instance, he accuses Hendershott of failing to demonstrate

that the trading in the Layering Loops is not consistent with

legitimate trading strategies. This ignores, among other

portions of the Hendershott analysis, the Position Analysis.

While this omission would not be disqualifying itself and could

be addressed through cross-examination of Ross, it serves as a

further illustration of the ways in which his testimony would be

misleading to the jury.

Portions of Ross's proposed testimony regarding layering,

however, do survive the SEC's motion. As reflected in a

footnote to his layering report, Ross calculates that 56.5% of

the Loud-side orders in the Layering Loops were placed "at or

inside" the NBBO. He also calculates that Avalon's Loud-side

orders had an average duration of 10.18 seconds.[24] Because Ross

lacks the specialized expertise necessary to opine on the

significance of these calculations, however, the results of

Ross's calculations are admissible only to the extent they are

tethered to other relevant and admissible expert testimony. As

discussed below, Grigoletto provides such relevant and

admissible testimony.

Ross's calculations may be relevant to layering because

FINRA has asserted that the placement of Loud-side orders by

reference to the NBBO may be indicative of layering. FINRA has

stated that layering involves placing non-bona fide limit orders

on one side of the market "at or away from the NBBO,"[25] and that

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[24] While Ross also calculates the percentage of Layering Loops
with Quiet-side orders that execute at a time when Hendershott's
Order Imbalance criterion is not met, this calculation is
inadmissible as irrelevant and misleading. As Hendershott
explains, Ross's calculation includes a Layering Loop whenever a
single Quiet-side order within that Layering Loop executes at a
time when the Order Imbalance criterion is not met; it does not
measure the number or percentage of these Quiet-side executions.
Properly measured, only a miniscule percentage of Quiet-side
executions within these Layering Loops occurred when
Hendershott's Order Imbalance criterion was not satisfied.

[25] Press Release, Fin. Indus. Regulatory Auth., FINRA Joins
Exchanges and the SEC in Fining Hold Brothers More than $5.9
Million for Manipulative Trading, Anti-Money Laundering, and
Other Violations (September 25, 2012),

non-bona fide orders are "typically, but not always, [placed] above the offer or below the bid" (i.e., "outside" the NBBO).[26]

The SEC contends that Ross's calculations are misleading. In his reply to Ross's layering report, Hendershott claims that Ross's calculation is misleading because it combines Loud-side orders placed "at" the NBBO with those orders placed "inside" the NBBO. Hendershott calculates that, among the Loud-side orders analyzed, 22.1% were placed "inside" the NBBO, 34.4% were placed "at" the NBBO, and 43.5% were placed "outside" the NBBO. In contrast, among the Quiet-side orders, 61.4% were placed "inside" the NBBO, 30% were placed "at" the NBBO, and 8.6% were placed "outside" the NBBO. Hendershott claims that this data suggests that Avalon intended for its Quiet-side orders to execute at a much higher rate than its Loud-side orders. The significance of Ross's figures is for the jury to resolve. The parties' dispute over their significance does not require exclusion of the Ross calculations.

While many additional points could be made to show that Ross's opinion testimony is fundamentally unreliable and

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http://www.finra.org/newsroom/2012/finra-joins-exchanges-and-sec-fining-hold-brothers-more-59-million-manipulative.

[26] See FINRA Regulatory and Examination Priorities Letter (January 2, 2014), https://www.finra.org/file/2014-regulatory-and-examination-priorities-letter-0.

misleading, the above discussion is sufficient. The SEC has

shown that, with the exception of the calculations noted above,

Ross's report addressed to Henershott's layering opinions must

be stricken pursuant to the standards set forth in Rule 702 and

Daubert. For their part, the Lek Defendants have failed to

identify any other portion of that report that could survive and

provide the basis for admissible expert testimony by Ross at

trial.

C. Ross's Opinions on the Cross-Market Strategy

For very similar reasons, with the exceptions identified

below, Ross's testimony about the Cross-Market Strategy is

fundamentally flawed and unreliable. It would likely mislead

the jury if admitted.

It is worth noting here as well that Ross does not deny

that the phenomenon of securities price manipulation through a

Cross-Market Strategy exists. But, as was true in his analysis

of Hendershott's reports, Ross improperly relies on a single

example from the SEC complaint to build an attack on Pearson's

methodology for locating evidence of Cross-Market Loops in

Avalon's trade data. Ross unreasonably concludes that Pearson's

methodology is overbroad because it does not follow precisely

the example of the Cross-Market Strategy provided in the SEC's

complaint. For the reasons discussed above, such testimony will

not help the jury determine either whether Pearson's analysis is

sound or whether Avalon engaged in manipulative trading.

Ross's arguments regarding selection bias fare no better in his attack on Pearson's analysis than they did in his attack on Hendershott's analysis. Ross contends that Pearson's analysis is unreliable because Pearson engaged in selection bias when he did not analyze or consider Avalon trading apart from the 796 Loops, and, in particular, when Pearson failed to consider the Avalon trading in stocks that involved no related options trading. As described above, Ross is misusing the term selection bias. Ross's critique also reflects a fundamental misunderstanding of the task Pearson undertook. Pearson was not attempting to pull a representative sample from all of the Avalon trading, but to analyze linked equity and option data to determine whether there were instances of linked trades consistent with a Cross-Market Strategy. Because that was his task, he had no reason to look at any equity trading unless there was also options trading in the same ticker and in the same time frame. He narrowed his database by requiring that the equity and options positions be open at the same time, and that there be no overnight positions. From these screening criteria he located 796 Loops, and through the process described above found that 636 of these Loops were consistent with a Cross-Market Strategy. Ross's testimony could lead the jury to conclude improperly that Pearson's analysis was tainted by

selection bias when the SEC is not claiming that the Cross-Market Loops are representative of all of the Avalon trading.

Ross's attacks on particular aspects of the Pearson analysis are no more valid. Ross complains about certain criteria employed by Pearson, but he provides no reason why the criteria are not valid. He does not cite any recognized source or reliable basis for his complaint and lacks the expertise to form any reliable opinion of his own. In other instances, his critique hinges on a mischaracterization of Pearson's work. Ross also ignores analyses disclosed in Pearson's report that confirm Pearson's conclusions but that undermine Ross's own argument.

Ross also improperly invites the jury to speculate. He contends that the price movements observed in Pearson's analysis could have been caused by other information entering the market and not the Cross-Market Strategy. Ross does not support this argument with any independent analysis or case study. In making this argument, he also mischaracterizes Pearson's testimony and essentially ignores or misunderstands several of the confirmatory tests conducted by Pearson, including the Return Reversal and News Analysis tests.

Although the Lek Defendants have not identified parts of Ross's report that might survive the motion to exclude, two portions of his report are admissible. In a footnote to

paragraph 18, Ross calculates how often stock prices were

unchanged or moved in the opposite direction of the stock trades

in Avalon's Cross-Market Loops.[27] The results of these

calculations are admissible because they are tied to relevant

and admissible testimony provided by Grigoletto. In addition,

in paragraph 44 of his report, Ross disaggregates Pearson's

average trading revenues and reports that some Cross-Market

Loops did not fit the pattern Pearson describes. This is

admissible rebuttal testimony. Ross is qualified to perform the

calculations, and the jury may weigh their relevance.

In sum, the SEC has shown that Ross's opinions on Pearson's

analysis misconstrue that analysis and are unsupported by the

evidence he cites to support these opinions. Accordingly, with

the exception of the calculations described above, the SEC's

motion to exclude Ross's testimony about the Cross-Market

Strategy is granted.

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[27] In the same footnote, Ross also calculates the percentage of
Cross-Market Loops in which an options order was either placed
or executed prior to the first execution of a stock order.
Ross's presentation of this calculation is fatally misleading.
Ross does not report the number or percentage of options orders
within a Loop that are placed or executed prior to the first
execution of a stock order. As Pearson explains, in the Loops
Ross singles out, nearly all options contracts placed prior to
the first equity execution were single-contract orders. They
represent less than 5% of the total number of options contracts
placed, and less than 1% of the total number of options
contracts executed, in these Loops. Ross's calculation is
excluded.

IV. The SEC's Motion to Exclude Grigoletto

The SEC moves to exclude Grigoletto's expert testimony, which the Lek Defendants seek to introduce to rebut testimony from Hendershott and Pearson. The SEC contends that Grigoletto lacks the expertise to serve as an expert on the topic of layering, and that, in any event, his opinions on both layering and the Cross-Market Strategy must be stricken as unreliable. The SEC's motion is granted in part.

A. Grigoletto's Expertise

Grigoletto has thirty-seven years of experience in the securities industry. He has worked as an options market maker, an institutional trader, and a portfolio manager. He worked for nearly ten years as a senior vice president at the Boston Options Exchange. It is undisputed that these credentials, among others, qualify Grigoletto to provide his opinions on the functioning of the U.S. securities markets and in particular options trading.

The SEC moves to strike Grigoletto's testimony as an expert on the topic of layering. The SEC contends that, because Grigoletto does not have relevant experience as a market maker or high frequency trader, his testimony regarding Avalon's layering strategy should be excluded. The SEC points to passages in his deposition testimony in which he admits that his knowledge of particular market operations is limited. While

Grigoletto lacks first-hand knowledge of important operations on which he offers opinions, Grigoletto's thirty-seven-year career in the securities industry, including in positions of significant responsibility, qualifies him to render an opinion regarding Avalon's layering strategy. To the extent his opinions regarding layering are admissible, the SEC may cross-examine him regarding the limits of his expertise in this area of trading. His opinions will not be excluded on the ground that he lacks expertise.

B. Grigoletto's Opinions on Layering

With narrow exceptions, Grigoletto's opinions on layering must be excluded. Most of Grigoletto's opinions are naked statements without any supporting analysis. These conclusory statements, unaccompanied by any description of the data examined or the analytical steps taken to form the opinions, are inadmissible for their failure to meet the requirements for expert opinion testimony imposed by Daubert.

Rather than address the specific allegations of layering in this case, much of Grigoletto's layering report offers opinions reflecting his policy preferences. For example, Grigoletto explains that he "find[s] it puzzling" that the SEC has taken issue with Avalon's trades, that "[t]he securities markets are supposed to be competitive," and that, if Avalon's trades reduced the profits of market makers and high-frequency trading

firms, "the solution is for the [high-frequency trading] firm[s] to change their algorithm[s]." These personal opinions about what the law is or should be invade the province of the court to instruct the jury on the law and would mislead the jury in its application of the federal securities laws.

In addition, Grigoletto offers broad conclusions based on an examination of a miniscule set of trades. Grigoletto offers opinions premised on his analysis of the full limit order book for Avalon's trading in a single security, CAB, over a 45-minute period. This trading included just four of the 675,504 Layering Loops. This extremely limited set of data provides no reliable basis from which to form an opinion about the larger set of Layering Loops or Hendershott's analysis.

Grigoletto also makes statements that are just flat wrong. For example, some of Grigoletto's opinions are premised on his assertion that Hendershott did not consider Avalon's trading data apart from the Layering Loops. That is incorrect. Hendershott applied his conservative criteria to the entirety of Avalon's trading data to identify the Layering Loops. Similarly, Grigoletto may not mislead the jury by suggesting that Avalon's trades outside the Layering Loops reflect legitimate trading, when he has done no analysis to support such a statement. The fact that the SEC is pursuing its layering claim based solely on the trading in the Layering Loops is not a

concession that the remainder of Avalon's trading is legitimate or that that trading did not involve additional efforts at layering. Even if he had conducted an analysis to show that some trading outside the Layering Loops did appear to reflect legitimate trading, Grigoletto may not mislead the jury by suggesting that, because those trades appear legitimate, none of the trading in the Layering Loops can be manipulative.

Portions of Grigoletto's report, however, present "shaky but admissible" evidence best addressed by cross examination. See Daubert, 509 U.S. at 596. Citing to two of Ross's calculations, Grigoletto observes that Avalon's Loud-side orders remained in the market for an average duration of 10.18 seconds and were "primarily at or inside the NBBO." Based on these datapoints, Grigoletto argues that Avalon's Loud-side orders were "at risk" to execute and therefore inconsistent with the SEC's assertion that Avalon did not "intend" these orders to execute.[28] Grigoletto reaches this conclusion without addressing other relevant data, such as the number of orders "inside" the NBBO as opposed to "at" the NBBO, the relationship of the Loud-side orders to the movement of the NBBO midpoint, the

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[28] Grigoletto also relies on a Ross calculation to assert that there are "numerous" instances in which Avalon did not have an Order Imbalance at the time of a Quiet-side execution. As explained above, the Ross calculation is so misleading that it has been excluded.

contrasting execution rates of the Loud- and Quiet-side orders,

or the cancellation rates of the Loud-side orders immediately

following the execution of the Quiet-side trades. Although

these and other omissions suggest that Grigoletto's analysis of

the alleged layering strategy is weak, those weaknesses go to

the weight to be accorded his opinions and that is for the jury

to determine.

In sum, the SEC has shown that nearly all of Grigoletto's

proposed testimony is misleading and unreliable or inadmissible

for other reasons. Accordingly, with the exception of the

portions of his report identified above, the SEC's motion to

exclude Grigoletto's testimony is granted.

C. Grigoletto's Opinions on the Cross-Market Strategy

With the exception identified below, Grigoletto's opinions

on the Cross-Market Strategy must be excluded for many of the

same reasons discussed in connection with his opinions on

layering. Grigoletto states that he reviewed Ross's report and,

combined with his own experience, determined that Avalon's

options trading was consistent with a desire to seek a profit

and was legitimate. With few exceptions, Grigoletto does not

explain how the information in Ross's report added to his

understanding of Avalon's trading. Instead, Grigoletto's

opinions on the Cross-Market Strategy are largely naked and

conclusory assertions that are unsupported by any methodology or meaningful explanation.

Grigoletto's conclusory analysis is exemplified by the following. Grigoletto opines that Pearson failed to consider "the large number of stock transactions with no corresponding options trade," which Grigoletto says demonstrate Avalon's intention to use stock trades to gauge liquidity. Grigoletto does not explain the basis for his conclusion that Avalon's stock trades were consistent with a practice of testing liquidity. Grigoletto must provide more than his ipse dixit to make his opinions admissible under Rule 702 and Daubert. Nor does Grigoletto explain how observations of stock trades outside the Cross-Market Loops informs an understanding of the stock trades in those Loops. As described above, this is a false comparison that indicates nothing about the legality of the trading within the Cross-Market Loops.

Grigoletto reports that he reviewed a complaint filed with the SEC by Citadel Securities. Citadel executed against some of Avalon's options trades and complained to the SEC about Avalon's market practices. This portion of Grigolett's report is irrelevant. The SEC's allegations are contained in its own complaint and have been explained further during the discovery process and the production of its expert reports.

Some of Grigoletto's opinions on the Cross-Market Strategy are little more than expressions of policy preferences. For instance, he argues that Avalon's strategy was not risk-free and that large market makers did not have to use the equities markets to hedge their options positions. These arguments do not help the jury understand the nature of the trading at issue in the transactions which the SEC asserts formed Avalon's Cross-Market Strategy. To the extent that they are opinions about the lawfulness of the alleged strategy, they are inadmissible.

There is a portion of Grigoletto's proposed testimony that is admissible. In paragraph 59 of Grigoletto's report, he relies on calculations that Ross performed to identify Cross-Market Loops where the stock price either remained unchanged or moved in the opposite direction of Avalon's stock trades. Based on Ross's calculations, Grigoletto opines that, "[i]f Avalon's trading was dependent on moving the stock price," Avalon "would never have engaged in option purchases under these conditions."

The Lek Defendants have failed to meet their burden to show that the remainder of Grigoletto's testimony on Avalon's Cross-Market Strategy is admissible under Rule 702 and Daubert. Nor have they identified other portions of relevant testimony that could be admitted notwithstanding the above-mentioned deficiencies. For these reasons, Grigoletto's testimony regarding the Cross-Market Strategy is excluded with the single

exception just described.

V. The SEC's Motion to Exclude Bodek

The SEC also moves to exclude Bodek's expert testimony, which the Avalon Defendants seek to introduce to rebut testimony from Hendershott and Pearson. The SEC contends that Bodek's opinions are unreliable and would confuse the jury.[29] The SEC's motion is granted.

A. Bodek's Opinions on Layering

Bodek's opinions on layering must be excluded. His report is difficult to understand. He relies on jargon and provides little or no analysis to support his opinions. Those opinions which appear to lie at the heart of his analysis rest on faulty logic and would mislead the jury if admitted.

To begin with, Bodek's forty-five-page, single-spaced layering report is dense, confusing, and riddled with jargon he does not explain. For example, Bodek describes Avalon's Loud-side orders at different points in his report as an exploratory trading strategy, a market-impact strategy, a pressure strategy or book pressure component, and a price discovery strategy. Bodek claims that Avalon's Quiet-side orders were part of a quasi-market making and scalping strategy. It is not clear what

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[29] The SEC does not question Bodek's qualifications as an expert. Bodek has substantial private-sector experience as an electronic trading executive and algorithmic trading strategist.

each of these terms mean, and Bodek does not explain how these strategies interact. He does not cite any authority that would permit one to distinguish a "'quasi' or 'de facto' market maker" from a true market maker. As described above, brokers engaged in the business of making a market are highly regulated. Bodek does not explain how a non-regulated entity can engage in quasi-market making activity. Nor does Bodek distinguish quasi-market making from the strategy of "scalping" -- a term that Bodek also fails to define. At times, Bodek contradicts himself. For instance, Bodek acknowledges that a "market impact" strategy is not really a strategy, but a cost that traders incur when an order executes. Even if one understood each of these strategies, Bodek does not explain how one can identify them from an examination of trading records. Because substantial portions of Bodek's report are unintelligible, Bodek's report on layering is excluded for its failure to meet Daubert standards. In addition, much of Bodek's report appears to be little more than the use labels and jargon to confuse and to create an appearance of legitimacy. For this reason as well, the report must be stricken.

Bodek's tendency to make assertions without explaining the basis for the assertions is particularly troubling. Some of the assertions appear to be statements of Avalon's intent, a topic on which no expert is qualified to give an opinion. While Bodek

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is qualified to describe typical trading strategies, to make such testimony relevant and admissible he would have to define the characteristics of those strategies, link those strategies to Avalon's trading, and explain the process that he followed in doing so. Without such explanations, the SEC has no ability to test the accuracy of his observations and a jury has no ability to evaluate the reliability of his opinions.

Bodek's practice of making assertions without any analysis to support them is exemplified by the following example. Bodek asserts that Avalon's Loud-side orders were "bona fide" orders. He fails, however, to explain coherently why they failed to execute if that was so. Instead, Bodek asserts that the Loud-side orders failed to execute because "no contra-side liquidity [was] available." Bodek conducts no empirical or statistical analysis of market liquidity to support that hypothesis. Nor does he address Hendershott's reasons for concluding that the unhealthy execution rates of Avalon's Loud-side orders, when compared to the execution rate of the Quiet-side orders, could not be explained by a lack of liquidity. As Hendershott points out, Bodek offers nothing to explain the illiquidity swings between the Loud- and Quiet-side orders or how Avalon was able to consistently obtain a profit by selling high and buying low

on the sides with a purported absence of liquidity.[30] Instead,

Bodek offers speculation. He speculates that "it is possible

that Avalon was trading in an environment where there [was] a

lack of natural buyers and sellers on both sides of the market,"

and that Avalon "would have undoubtedly" traded differently if

its Loud-side orders executed. Since Bodek provides no

"explanation as to how [he] came to his conclusion," nor of

"what methodologies or evidence substantiate [it]," Riegel v.

Medtronic, 451 F.3d 104, 127 (2d Cir. 2006), this entire line of

proposed testimony must be stricken.

There are portions of Bodek's report in which he presents

conclusions based on a review of Avalon's trading. In doing so,

however, he engages in two errors that render even these

conclusions unreliable and inadmissible. First, Bodek draws

conclusions about all of Avalon's trading based on a review of a

small, non-representative number of Layering Loops. Second,

Bodek disaggregates the Loud and Quiet sides of these Loops,

argues that each reflects a legitimate trading strategy, and

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[30] According to Hendershott, the Avalon Trade Data contains more than 80,000 examples of "back-to-back" Layering Loops. In these instances, some of which were provided as examples in Hendershott's report, Avalon quickly reversed the direction of its Layering Loop immediately after executing its Quiet-side order. Bodek fails to explain how Avalon could expose a lack of liquidity on the sell side, execute its Quiet-side order on the buy side, and then immediately expose a lack of liquidity on the buy side.

concludes that the combination of two legitimate strategies cannot constitute manipulative trading. A description of each of these errors follows.

Bodek analyzed eight of the 675,504 Layering Loops. The eight Loops were examples highlighted in Hendershott's report. Hendershott used each example to illustrate and apply criteria he used to identify the Layering Loops. From the eight examples, which represent less than 0.0012% of the Layering Loops, Bodek draws a series of broad conclusions about the whole of Avalon's trading, including that Avalon's trading "does not amount to layering" and "does not constitute market manipulation."

Bodek's reliance on the eight examples of Layering Loops is misplaced. Hendershott did not use the eight examples to draw conclusions about the Layering Loops; he drew his conclusions from a review of the entirety of the Avalon dataset. While Hendershott may have found these eight examples of assistance in explaining his methodology, his use of these examples does not mean that they constitute a scientifically representative sample of the 675,504 Layering Loops -- much less of all of Avalon's trading. To draw conclusions about Avalon's trading based on the eight examples, Bodek would have to show that they are representative of the whole. This he has not done. See E.E.O.C. v. Kaplan Higher Educ. Corp., 748 F.3d 749, 754 (6th

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Cir. 2014) (affirming exclusion of expert testimony for reliance on non-representative sample); Cf. Tyson Foods, Inc. v. Bouaphakeo, 136 S. Ct. 1036, 1048 (2016) (noting that reliable inferences cannot be drawn from "[r]epresentative evidence that is statistically inadequate or based on implausible assumptions"); Fed. Housing Fin. Agency v. JPMorgan Chase & Co., 2012 WL 6000885 (DLC), at *1 (S.D.N.Y. Dec. 3, 2012) (evaluating reliability of sampling methodology).

An example will suffice to illustrate the significance of Bodek's error. From a review of the eight examples, Bodek argues that Avalon's Loud-side orders "typically" were placed inside, and thus "improve[]," the NBBO. This is significant, he claims, because FINRA once described layering as the placement of non-bona fide orders "at or away from the NBBO." Because he claims orders "improving the NBBO on one side of the market . . . do[] not [fit] the definition of layering," Bodek concludes that Avalon's Loud-side orders in the Layering Loops are inconsistent with a layering strategy. Even if Bodek has correctly captured a definition of layering, his core premise -- that Avalon's Loud-side orders "typically" improved the NBBO -- cannot rest on a review of eight Layering Loops.

In his second error in analysis, Bodek disaggregates the Loud and Quiet sides of the eight Layering Loops, contends that each side of the trading reflects a legitimate market strategy,

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and then implies that the combination of two legitimate strategies cannot manipulate the market. First, Bodek provides no objective basis from which one could conclude that a legitimate market strategy was being pursued even for one side of the trading. Second, his argument rests on a fallacy: he is trying to generalize from an unrepresentative set of eight examples. Third, Bodek's disaggregation of each Layering Loop is improper. The disaggregation fails to engage with Hendershott's analysis; it reflects no analysis of the entirety of the trading within a Layering Loop, much less with the pattern of trading that appears when all of the trading in the 675,504 Layering Loops is examined together. Finally, the disaggregation reflects a logical flaw: that a combination of strategies cannot be improper if each constituent strategy, taken in isolation, could be viewed as a proper. Even if market impact and quasi-market making strategies are legitimate with pursued independently -- and Bodek has not demonstrated either that that was what was occurring or how one could detect that it was occuring -- they are not necessarily legitimate when combined.[31]

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[31] Bodek's analysis arises from a faulty syllogism no different from the following example: Drinking is legal; driving is legal; therefore, drinking and driving is legal. Of course, that is not so.

The deficiencies recited above permeate Bodek's analysis. Accordingly, the SEC's motion to exclude Bodek's testimony offered in rebuttal to Hendershott's layering analysis is granted.

B. Bodek's Opinions on the Cross-Market Strategy

Bodek's opinions addressed to the Cross-Market Strategy reflect many of the same deficiencies that undermine the admissibility of his expert testimony on layering. Much of Bodek's Cross-Market Strategy report is difficult to decipher; it consists of meandering explanations that are difficult to follow and evaluate; and the report relies heavily on the use of jargon. The labels, terms, and industry jargon it uses are poorly explained or not explained at all. Bodek did no independent analysis of Avalon's trading data and does not engage in any substantial way with Pearson's report.[32]

The thrust of Bodek's opinion on Avalon's Cross-Market Strategy is that it existed but is entirely legal.[33] This expert

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[32] For example, Bodek repeatedly states that Avalon's equity trades did not have any artificial price impact, and that the options trades were profitable because they captured excessive liquidity. Bodek does not explain precisely what he means or how to assess the validity of these opinions. He describes no empirical analysis to support these assertions.

[33] Bodek asserts, for instance, that "Avalon cannot be punished because other market participants chose to trade against Avalon's aggressive trading and may have been exposed to" losses.

testimony is inadmissible. It is for the court to instruct the jury on the legal standards they shall apply. Bodek's testimony, if permitted, would invade the province of the court to instruct the jury on the law and the province of the jury to determine whether the conduct in which Avalon engaged was illegal pursuant to those instructions.

Bodek also offers opinions based on an examination of just three Cross-Market Loops -- three Loops that Pearson used to illustrate his findings. Pearson identified more than 636 Cross-Market Loops and based his conclusions on a rigorous multi-part analysis of thousands of transactions. Bodek acknowledges that data beyond the three examples "may contain activity that deviates from the topics addressed in his report." Nonetheless, he draws broad conclusions based on this non-representative sample. These three examples do not provide any adequate basis for an expert's opinions. To the extent his opinions rest on his study of these three examples, they are unreliable and must be excluded.

As he did in his layering analysis, Bodek separates Avalon's Cross-Market Strategy into its constituent parts and implies that, because each is legitimate in isolation, the Cross-Market Strategy is also legitimate. This reflects the same flaws explained above in connection with Bodek's layering analysis. Even if Bodek had demonstrated that Avalon's trading

strategies in each market were independently legitimate, Bodek's

failure to evaluate these strategies in the context of a

coordinated strategy renders his opinions irrelevant and

misleading.[34] To the extent Bodek's opinions in this section of

his report are an attempt to instruct the jury on a legal

standard, they must be stricken for that reason as well.

For the foregoing reasons, the SEC has shown that Bodek's

Cross-Market Strategy report would be unreliable and unhelpful

to the jury. The Avalon Defendants have not identified a

portion of Bodek's testimony that could survive the SEC's

motion. The SEC's motion to exclude Bodek's testimony about

Avalon's Cross-Market Strategy is therefore granted.

Conclusion

The Lek Defendants' August 24, 2018 motions to exclude the

testimony of Hendershott and Pearson are denied. The SEC's

October 5, 2018 motion to exclude Bodek is granted. The SEC's

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[34] When responding to Pearson's claim that Avalon's equity trades
had "no legitimate economic rationale," Bodek states that
"Avalon's market impact strategy [that is, its equity trading]
is not conducted as a stand-alone strategy with a siloed
profitability, but instead is traded in conjunction with an
options component which is essential to accessing liquidity and
locking in profit." In this statement, Bodek appears to concede
Avalon engaged in the Cross-Market Strategy and that the equity
and options trading conducted as part of that strategy should be
evaluated as a whole. He does not explain, however, why such a
strategy is not manipulative.

October 5, 2018 motions to exclude the testimony of Ross and Grigoletto are granted in part.

There are portions of the Grigoletto report which provide background information about securities markets, define industry terms, and explain industry practices. The SEC motion was not addressed directly to those sections. To the extent those discussions set the stage for the inadmissible opinions that followed or are intertwined with the stricken testimony, they are necessarily encompassed by today's ruling. Nonetheless, should the Lek Defendants conclude after review of this Opinion that it would remain useful at trial to provide some of this testimony about general market functioning to the jury, they shall identify those passages in the expert reports to the SEC. If the parties are unable to reach an agreement, the issue may be litigated in the context of a motion in limine filed in advance of trial.

Dated: New York, New York
          March 14, 2019

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DENISE COTE
United States District Judge